



Axel Cleeremans
Consciousness, Cognition & Computation Group
Center for Cognition & Neurosciences
Université Libre de Bruxelles
Avenue F. Roosevelt, 50 CP 191
1050 Bruxelles
t : +32 (0)2 650 32 96
f : +32 (0)2 650 22 09
m : axcleer@ulb.ac.be
w: crn.ulb.ac.be
be0407 626 464

CONCERNS: Review of Roman V. Tikhonov

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THE REVIEW

of a member of the dissertation council on the dissertation of Roman V. Tikhonov on the topic: "Social verification of implicit knowledge" submitted for the degree of Candidate of Sciences in Psychology in the specialty field 19.00.01 — General Psychology, Personality Psychology, History of Psychology

Overview of the work

The thesis submitted by Roman V. Tikhonov (in its English version) is a document of a 102 pages structured in two chapters flanked by an Introduction, by a "Findings" section, and by a short Conclusion. The thesis concerns a very interesting topic, namely the effects of social knowledge and interaction on implicit learning — the phenomenon through which we seem able to learn in the absence of awareness. The thesis describes three empirical studies pertaining to this topic.

The Introduction overviews the core topics of the work, spells out the hypotheses, and briefly describes the empirical work. Three statements are to be defended, the most interesting of which is the idea that social verification is mediated by metacognitive processes.

Chapter 1 provides a broad and well-balanced overview of the core topics that are addressed in the thesis: Social effects on behaviour, and implicit learning. Important issues, such as assumptions about the cognitive architecture that define the differences between implicit and explicit learning, as well as empirical challenges such as the assessment of awareness, are discussed adequately and demonstrate M. Tikhonov's mastery of the relevant literature. Novel ideas are introduced about the metacognitive experiences associated with implicit knowledge. M. Tikhonov distinguishes three levels at which social effects (social verification) can express themselves in joint interactions (specifically, dyadic interactions): The behavioural, metacognitive, and explicit levels. The Chapter concludes by a brief description of the empirical work.

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Chapter 2 forms the core of the thesis and describes three studies in slightly different paradigms of implicit learning: A perceptual categorization task (Experiment 1), a hidden covariation paradigm (Experiment 2), and an artificial grammar learning task (Experiment 3). All three experiments share roughly the same structure, in which participants carry out the task individually (Phase 1) and are then tested jointly (Phase 2) then individually (Phase 3), after which their explicit knowledge is assessed (Phase 4).

Experiment 1 involves a perceptual categorization task in which participants are first asked to memorize abstract shapes representing cartoon renditions of alien organisms called Zoki. Unknown to participants, all Zoki instances share some features (concavity, horizontal symmetry). After memorization, participants are informed about the fact that all memorized stimuli belonged to the same Zoki category, and are then asked to categorize new shapes as either Zoki or not. In the “Individual” condition, participants carry out this task on their own, while in the “Dyadic” condition, they carry out the task jointly with another participant who had likewise been exposed to the memorization phase. A “Control” group that has not memorized the stimuli carries out a preference task on the new shapes. A second test phase, always carried out individually, follows. All participants are then tested for their explicit knowledge of the rules, using the process dissociation procedure (PDP). The results indicate learning, as evidenced by performance on the first test phase, in both conditions of interest, which do not differ from each other. In the second, individual test phase, performance decreases, but less so for the participants in the dyadic condition, suggesting a preservation of the effects of the social interaction. Learning was mostly implicit as suggested by the results of the PDP phase.

Experiment 2 uses a more complex design based on the hidden covariation paradigm developed by Lewicki. Participants are exposed to photographic portraits of women’s faces and their IQ (four categories) and asked to memorize the faces associated with a high IQ. Unknown to participants, two irrelevant features of the portraits are predictive of IQ: hairstyle (loose or gathered) and background color (grey or yellow). This makes it possible to define dyads of participants that are exposed to either congruent, incompatible, or partially compatible associations between the irrelevant features and IQ. Participants are then tested individually or in dyads in a first test phase. In a second test phase, participants perform the task individually, and in a third test phase they again perform the same classification test as in test phase 1, individually. A post-experimental interview follows. Confidence is requested for each decision. Different results attest to the success of the manipulations: Reported disagreements, as well as reaction times were higher in the conflict conditions. The results of the first test phase reveal an overall effect of stimulus type, but not interaction with condition. The results of the second and third test phases unexpectedly reveal a strengthening of the learned covariation in the conflict condition: People’s perceived IQ estimates correlate more with stimulus type in the the conflict condition than in the other conditions. This is also reflected in post-decision confidence: People express greater metacognitive sensitivity in the conflict conditions. M. Tikhonov interprets these results as suggesting that social interactions are mediated through metacognitive sensitivity.

Experiment 3 involves an artificial grammar learning task. Participants are asked to memorize series of geometric shapes containing letters that had been generated following a set of artificial grammar rules. They are then presented with new strings and asked to classify them as belonging to the trained grammar or to a novel grammar. In this test phase, they are also exposed, in the experimental condition, to the responses and confidence of a partner, and offered an opportunity to change their own response in a second decision. A control group likewise makes two decisions but without seeing the partner’s choices. A second test phase tests all participants individually, and the experiment closes with a PDP test. The results indicate good learning of partially explicit (PDP) knowledge, and that dyadic interaction in the way implemented here helped people maintain their accuracy.

The thesis closes with a conclusion and a summary of the main claims. M. Tikhonov presents an interesting descriptive theoretical framework that illustrates the mechanisms through which social verification operate at the three levels of behaviour, metacognition, and explicit knowledge.

General evaluation of the thesis

Overall, this a very good thesis in Experimental Psychology. Starting from the interesting question of determining if and how social interactions influence the mechanisms through which we can learn without awareness, M. Tikhonov proposes three substantial studies involving three different implicit learning paradigms to explore a set of specific hypotheses related to the main thesis. In this work, M. Tikhonov demonstrates mastery of experimental design and of statistical methods, as well as solid knowledge of the relevant empirical literature and associated theoretical positions. The proposed studies are highly original and explore a set of interesting hypotheses. The core strengths of the work are the innovative experimental paradigms and the careful analysis of the effects of social interaction on decisions.

The work leads to many questions, some theoretical, others concerning the methods used.

One can question, for instance, the extent to which the acquired knowledge is truly “implicit”, or unconscious — in this, the studies share many of the same pitfalls identified by Shanks as many other studies. One could also have expected a deeper discussion of one of the main claims of the thesis, namely that social effects in such learning situations are mediated by metacognitive factors. Presumably, the author could have computed commonly used metacognitive sensitivity measures such as meta d' , and hence engage in more sophisticated analyses of metacognitive sensitivity. One would also have wished to see more discussion of the actual contents of the social interactions in the first two experiments, where participants were free to actually discuss their criteria, as well as a more complete understanding of how interacting with a confederate actually increases *implicit* knowledge (at first sight, one would expect such interactions to make implicit knowledge more explicit). Such questions, however, are suggestive of the richness of M. Tikhonov’s thesis rather than questions about its quality. Implicit learning, as a field, remains a complex domain in which uncertainties abound about both core theoretical concepts as well as about the methods used to establish its existence. The work of M. Tikhonov represents a clear advance in this domain, one that is likely to lead to further developments in the exploration of the effects of social interactions on learning.

Thus, the dissertation by Roman V. Tikhonov on the topic “Social verification of implicit knowledge” meets the basic requirements established by Order No. 6821/1 of September 1, 2016, “On the Procedure for Awarding Academic Degrees at St Petersburg State University,” the applicant Roman V. Tikhonov deserves to be awarded the degree of Candidate of Sciences in Psychology in the specialty field 19.00.01 — General Psychology, Personality Psychology, History of Psychology. Clause 11 of the aforementioned Order is not violated.

Member of the dissertation council

Ph.D. in Psychology
Director, Center for Research in Cognition & Neurosciences
Université Libre de Bruxelles



Axel Cleeremans